# Tandata Tm512Tp

# User Manual

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IM038

## INTRODUCTION

The Tandata Tm 512TP has been specially designed to work with the software and computers most commonly used by schools. These computers include the BBC, RML380, 480 series and the IBM PC.

Software is normally available rrom three sources. Times Network for Schools, Prestel Education and Communitel (see Appendix 1 for addresses and telephone numbers).

## CONTENTS

Tandata supply the Tm 512TP in a cardboard box that contains the modem and a manual.

## SETTING UP THE MODEM

When the modem has been unpacked you will see that it has a black lead with a three pin moulded plug attached. This should be plugged into a suitable supply socket, (240VAC 50 cps). If for any reason you wish to change this plug, consult Appendix 2. Pressing the On/Off power switch on the front of the modem should illuminate the red PWR (power) light.

The white cable that emerges from the back of the modem under the power line should be plugged into a 600 series BT socket. Note that problems are often caused by using the modem with internal PABX equipment. See Appendix 3 for more details.

Cables for connecting the computer to the back of the modem are in some cases supplied with the software e.g. TTNS. Some other softwares may be supplied without a cable.

In such cases Tandata can supply the following cables to connect the following computers to the TM 512 TP.

| Computer | Cable Number |
|---|---|
| BBC | LD 800 |
| RML 380 | LD 811 |
| RML 480 | LD 812 |
| IBM PC | LD 810 |

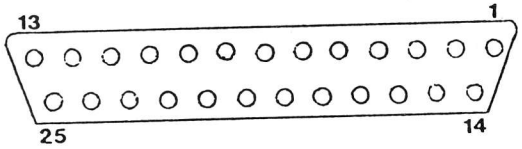
The cable should be plugged into the modem socket marked RS 232. The other end of the cable should be plugged into the computer serial data or RS 232/RS423 socket.

**Note** BBC users should be aware that the 5 pin din plug will insert in two orientations. Make sure that the indent in the metal surround of the plug is towards the cassette port (to the right as you are looking at the back of the computer).

## MODEM SERIAL DATA PORTS

**IMPORTANT:** Incorrect connections may cause serious damage to the interface. The Tandata TM 512 TP is fitted with two serial ports. One is a 25 way "D" port marked "RS 232", which supplies RS 232 voltage levels of ±8V. The other, marked "TTL", supplies TTL levels of 0 - 5V.

The pin outs and uses of the pins on these ports are as follows:



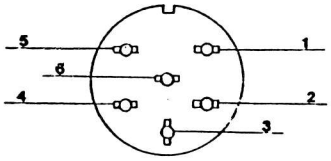

RS 232 socket viewed from rear of modem: This is also the view of the solder terminals of a mating plug.

| PIN NO. | SIGNAL |
|---|---|
| 2 | Tandata Data (input to modem) |
| 3 | Receive Data (output from modem) |
| 5 | Clear to send (output) |
| 6 | Data set ready (output) |
| 7 | Ground |
| 20 | Request to send (input) |

The RS 232 port can be used with a computer or terminal having an RS 232 or compatible interface, such as RS 423. Using all the signals on the modem's RS 232 port gives you full control over all aspects of the modem.

**TTL Socket**

A 6-way DIN socket is provided on the rear of the modem. The interface details are as follows:




TTL DIN SOCKET VIEWED FROM REAR OF MODEM - THIS IS ALSO THE VIEW OF THE SOLDER TERMINALS OF THE MATING PLUG

| PIN NO. | SIGNAL |
|---|---|
| 1 | Ground |
| 2 | +5 volt (output) |
| 3 | Receive data (output) |
| 4 | Clear to send (output) |
| 5 | Transmit data (input) |
| 6 | Request to send (input) |

If you have to use the TTL port, you will still be able to take advantage of the modem's features, unless any communications software being run on a micro requires DSR to be present.

Note: Signals on the TTL port are polarity reversed with regard to the RS 232 standard.

**RS 232 Nomenclature and Use**

The modem is fitted with the following lines on its V24 RS 232 port.

**TD**

Transmit Data signals on the transmit data circuit (pin2) are received from equipment which transmits data to the modem.

This signal should be held in the marking condition (-ve) during intervals between characters and at all times when no data is being received.

**RD**

Received Data signals on the receive data circuit (pin 3) are generated by the modem for transmisson to the attached terminal or computer equipment.

This signal should be in the marking condition (-ve) during intervals between characters and when no data is being received.

**CTS**

(Clear To Send). This signal is generated on pin 5 of the RS 232 serial port on the modem and indicates whether or not the modem is ready to receive data. The "off" (-ve) condition is an indication to the terminal or computer that data should not be sent to the modem.

**DSR**

(Data Set Ready). This signal is generated on pin 6 of the RS 232 serial port on the modem and has the following function.

When the modem is on but has not seized the telephone line DSR is in the (-ve) state.

When the modem seizes the telephone line but has not detected valid "carrier" the circuit is in the "off" (-ve) state.

When valid "carrier" is detected the circuit will change to the "on" (+ve) state.

**RTS**

(Request to Send). Request to send signals are received from equipment which controls the modem during half duplex operation.

The on condition (+ve) maintains the modem in the transmit mode. The off (-ve) condition maintains the modem in the receive mode.

## USING THE MODEM (GENERAL)

The softwares that are normally used with the Tm 512TP are informative and generally user-friendly. A large amount of detail, concerning their working, is given in the manuals that accompany the software.

General points to note during the use of the modem are as follows:

1) When the modem is turned on the PWR light should glow and the modem be silent.
2) When the modem is instructed to dial the user should be able to hear the modem seizing the line and dialling. The line light should glow and CDT (carrier detect) and RXD lights may occasionally flash.
3) When the modem has dialled there should be a short period of silence which may be followed by ringing and then a high pitched tone (2100 Hz. answer tone).
4) Shortly after the reception of answer tone (RXD and CDT lights on together) the speaker should mute and the CDT light remains glowing.
5) When data is received from the host the RXD (Receive Data) light should flash.
6) Sending data to the host i.e. by pressing keys on the keyboard of the computer should cause the TXD (transmit data light to flash.

## CONTROLLING THE MODEM. COMMANDS AND RESPONSES

The modem has two modes of operation. The mode into which it normally powers up is suitable for use with either TTNS or Prestel education software. Simple software commands enable the Communitel mode.

When the modem is sent a carriage return from the computer the modem will respond with [CR][LF] & +++
[CR] = Carriage Return [LF] = Line Feed

This indicates that the modem is ready to receive one of the following commands, which are not echoed.

| COMMAND | RESPONSE | ACTIONS |
|---|---|---|
| V21T<CR> | &+++ | Sets modem to 300/300 originate mode |
| V21C<CR> | &+++ | Sets modem to 300/300 answer mode |
| V23T<CR> | &+++ | Sets modem to 75tx/1200rx (power on default) |
| V23C<CR> | &+++ | Sets modem to 1200tx/75rx |
| V23H<CR> | &+++ | Sets modem to 1200tx/1200rx half duplex (RTS control) |
| V23P<CR> | &+++ | Sets modem to 1200tx/1200rx pseudo-duplex mode |
| T<CR> | &+++ | Connect to line direct (no dialling) in answer mode originate |
| C<CR> | &+++ | Connect to line direct (no dialling) in answer mode |
| 9;1234<CR> | &+++ | Dial number 91234....(with pause, see over) |
| AA<CR> | &+++ | Set modem to autoanswer mode |
| MA<CR> | &+++ | Set modem to manual answer mode |
| ^A^A^A^A | &+++ | (Four control A's) Clear down call, disconnect line |
| ALT<CR> | ++ | Enables Communitel interface |

**Note:** if any command above is appended with "X" the modem will disable its clear call command "trap" and become completely transparent to line. "Trap" is enabled again only by repowering the modem.

The response <CR> <LF> &??? will be sent by the modem to any invalid command.

On receipt of a dial number nnn,. command, the modem will reply as follows:

| | |
|---|---|
| <CR><LF>&DLG | The modem has detected dialling tone and has started to dial |
| <CR><LF>&DLG,12... | Numbers are echoed as they are dialled out |
| <CR><LF>&WAT | The number has been dialled, waiting for answer from host |
| <CR><LF>&CTL | Carrier from host has been detected |

From now on the modem will switch all DTE traffic to line and viceversa until the "trap" sequence <4 x CTL-A> is sent from the DTE (or DTR is dropped), in which case the modem will reply with:
<CR><LF>&DIS it will then drop the line.

The following "abandoned call" messages will be sent from the modem to the DTE if dialling proceeds (or if carrier is lost during online operation):

| | |
|---|---|
| <CR><LF>&NDT | Modem has not detected dialling tone |
| <CR><LF>&NAT | Modem has not detected answer (ringing)tone |
| <CR><LF>&NCD | Modem has not detected (or lost) carrier tone |
| <CR><LF>&DIS | Modem has been disconnected by a DTE command |

In manual-answer mode, if the modem detects incoming ringing tone, it will send the following prompt to the DTE:<CR><LF> & RNG

## SETTING THE MODEM UP FOR USE WITH COMMUNITEL SOFTWARE

1) Load the Communitel software and select the viewdata terminal from the menu
2) Now Key F3 followed by carriage return
3) Type ALT<CR>
4) When ALT is displayed on the right hand side of the screen press escape

The modem is now set to work with existing versions of Communitel software. Later versions will automatically set the modem.

## COMMUNITEL COMMANDS/RESPONSES

The Communitel responses are invoked by sending the modem ALT [CR] command.

The response from the modem should be ++.

| Command | Response | Action |
|---|---|---|
| V21T[CR] | ++ | Sets modem to 300 bps originate mode |
| V21C[CR] | ++ | Sets modem to 300 bps answer mode |
| V23T[CR] | ++ | Sets modem to viewdata originate mode |
| V23C[CR] | ++ | Sets modem to viewdata answer mode |
| V23P[CR] | ++ | Sets modem to pseudo duplex mode |
| V23H[CR] | ++ | Sets modem to half-duplex mode (RTS control) |
| BBC[CR] | ++ | Sets modem to pseudo duplex mode |
| MES[CR] | ++ | Sets modem to TTNS/Prestel emulation mode |
| | | **NB** A telephone number string may be appended to any of the above commands delimited by a space character or used independently. The default setting on power-up is pseudo duplex |
| EP[CR] | ++ | Sets modem responses to even parity |
| OP[CR] | ++ | Sets modem responses to odd parity |
| NP[CR] | ++ | Sets modem responses to no parity |
| AA[CR] | ++ | Sets modem to autoanswer under DTR control |
| MA[CR] | ++ | Sets modem to manual answer |
| 4 X CTRL'A' | DISCONNECTED | Disconnects modem if connected to line |
| C[CR] | CONNECTED | Connects modem to line in answer mode |
| T[CR] | CONNECTED | Connects modem to line in originate mode |

| Call Progress Messages | Meaning |
|---|---|
| Dialling | Modem is waiting before dialling number |
| 01...etc | Modem is dialling number |
| Waiting | Modem is looking for an answer tone |
| Connected | Modem is connected to line |
| **Abandoned Call Messages** | **Reason** |
| No dial tone | Modem has not detected dial tone |
| No answer | Modem has not detected answer tone |

| | |
|---|---|
| No DCD | Modem has lost data carrier detect |
| Disconnected | Modem DTE interface is disconnected from line |

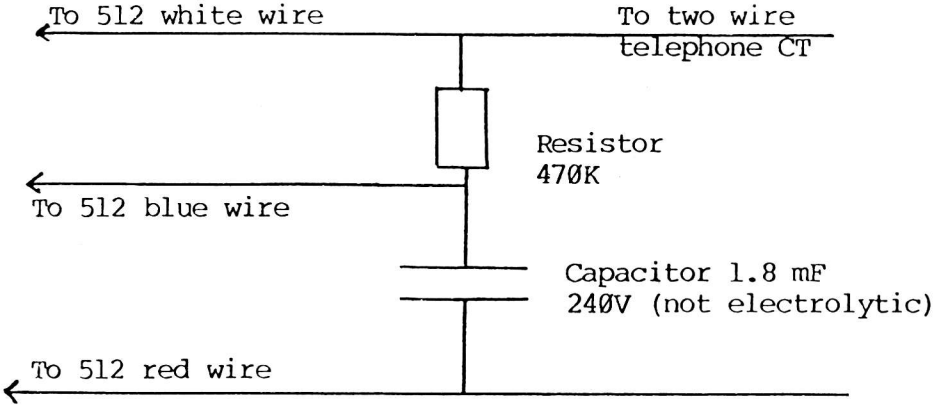
| **Other Modem Messages** | **Meaning** |
|---|---|
| Ringing | Modem has detected an incoming call |
| What? | Modem does not recognise input command |

## AUTO ANSWER SEQUENCE

The modem detects incoming calls and sends message 'RINGING' on the DTE interface. If the modem is set for autoanswer the modem will answer the call. If the modem is set for manual answer it will await commands from the computer before proceeding. The user may change the mode before answering the call or answer the call in a previously set mode, the power up default is autosensing between pseudo duplex and viewdata answer. To answer a call send the modem the command 'C[CR]', the connected message should be output by the modem.

## AUTOANSWER TELEPHONE LINE REQUIREMENT

The modem will not autoanswer unless it is connected to a 3 wire line system. There may be occasions where only a two or four wire system is available in which case British Telecom can be asked to provide an appropriate socket or Tandata can supply special adaptors for attachment to the phone line or you may obtain one from your dealer. It should contain the following components and be wired into the telephone system in the manner shown.


To 512 white wire
To two wire telephone CT
Resistor 470K
To 512 blue wire
Capacitor 1.8 mF 240V (not electrolytic)
To 512 red wire

Tandata supplies the circuit in a special box part number ACC14.

## TELEPHONE DIALLING STRING

The telephone number may be up to 18 digits long and can contain interdigit pauses as required. The delimiter';' will cause a 2 second pause, more than one delimiter may be used. If the delimiter ';'is used before the telephone number the modem will pause and not look for dial tone. If secondary dial tone detection is required use a "," as a delimiter.

## CLEARING DOWN A CALL

A call which has previously been set up can be cleared down using one of the following means.

a) Modem command '4 x CTRL 'A's'
b) Loss of carrier signal from the remote modem
c) DTR transition from high to low

**NB**
When using viewdata answer mode, the modem is looking for a signal of approximately 400 Hz, dial tone is set at 400 Hz. An algorithm has been written to distinguish between dial tone and data, and under normal circumstances the modem will recognise dial tone and disconnect.

**APPENDIX 1**

## SOFTWARE SUPPLIERS

TTNS
PO BOX 7
200 GRAYS INN ROAD
LONDON WC1X 8EZ

Tel: 01 833 7104

PRESTEL EDUCATION
TELEPHONE HOUSE
TEMPLE AVENUE
LONDON EC4Y 0HL

Tel: 01 822 1012

COMMUNITEL
189 FRESTON ROAD
LONDON W10 6TH

Tel: 01 960 7998

IMPORTANT

CHANGING THE PLUG

This apparatus includes a mains cord fitted with an integral moulded plug. If the available socket is not suitable for the plug supplied, then the plug must be cut off and an appropriate one fitted. The redundant plug must be DISPOSED OF to prevent SHOCK HAZARD through inadvertant insertion into a 13A socket elsewhere.

If the replacement plug does not contain an internal fuse, the apparatus must be used only on a mains circuit protected by a 3 amp fuse.

The wires in the mains cord are coloured in accordance with the following code:

| | |
|---|---|
| Green-and-yellow: | Earth |
| Blue: | Neutral |
| Brown: | Live |

The wire which is coloured green-and-yellow must be connected to the plug terminal which is marked by the letter E or by the safety earth symbol or coloured green or green-and yellow.

The wire which is coloured blue must be connected to the plug terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the plug terminal which is marked with the letter L or coloured red.

**CHANGING THE FUSE**

The mains plug fuse cover must be re-fitted when changing the fuse. If the fuse cover is lost then the plug must not be used until a replacement is obtained from the manufacturer. The colour of the replacement fuse cover is that of the coloured insert in the base of the plug. The apparatus must be protected with a 3 amp fuse which is ASTA approved to BS 1362.

Replacement fuse covers may be obtained through:

B.I.C.C. LIMITED
Waddicar Lane
Melling,
Liverpool
L31 1DF.

Tel: 051 547 2070

# TELEPHONE & DIAL PROBLEMS

## 1. NORMAL CONNECTION & SET UP

For trouble-free and enjoyable use of your modem:

* Arrange for British Telecom to install the correct telephone socket
* Ensure that the telephone socket, mains power, terminal etc are conveniently situated
* Check that telephone number being called is operational, the host modem is answering and the host computer is functioning

## 2. HOW TO IDENTIFY A PROBLEM

* Check modem and micro are powered-up (LEDS on?) and connected properly
* Do you have the correct telephone socket? You need a new white modular socket (called PST or 600 series socket)
* Do you get dial tone?
* Is the number dialled correctly?
* Is the host computer answering?

## 3. DO YOU GET DIAL TONE?

If in doubt:

first - check the phone is working correctly i.e. pick up receiver and listen

then - tell the modem to seize line. You should hear normal dial tone through the modem's loudspeaker

If not - see below

Remember that some exchanges require a 9 or similar digit to get an outside line, or a "call" button may have to be depressed.

Some "slow" exchanges require a pause - a semi colon in the telephone number forces a 2 second pause.

**4. IS THE NUMBER DIALLED CORRECTLY?**

Correct dialling is confirmed when the host modem answers with a high-pitched tone (i.e. carrier). If dialling process appears normal but carrier is not heard, check your telephone number and dial procedure. If still unsuccessful, dial the number using telephone handset.

If no carrier tone is heard on the telephone earpiece you must try another number.

If carrier tone is heard, try again with the modem. If still unsuccessful. See below.

Conventional pulse dial is used on all domestic lines and most private business exchanges.

Tone dial consists of a rapid series of tones and sounds quite different from pulse dialling.

**5. IS THE HOST ANSWERING?**

If no high-pitched tone (i.e. carrier) is heard from the host computer's autoanswer modem, it is possible that the local access node or modem is inoperative. Test your equipment on another known number.

A selection of numbers is as follows:

| | | | |
|---|---|---|---|
| 021 643 4030 | | 021 214 6191 | |
| 021 618 1111 | 1200/75 Prestel | 021 214 5139 | PSS |
| 01 618 1111 | | 01 825 9421 | |

**6. A) LEASED LINES**

Tandata modems are designed for use with the normal public switched telephone network. Tandata can provide special modems at extra charge for use with leased lines.

**6. B) BLEEP-BLEEP-BLEEP INSTEAD OF DIAL TONE**

This can occur on private business exchanges of key systems such as Ensign. Herald, Merlin S/3012. It is caused by the fact that these exchanges use a wire for sending data to the private exchange that is also used for suppressing the "tinkle" on a telephone during autodial on a normal 3-wire installation.

This problem arises with all autodial equipment.

You should arrange for British Telecom to install the correct socket. Alternatively Tandata can supply a special telephone line "splitter", which plugs into the wall socket, and to which the telephone handset and modem can be connected. Be careful to specify this special splitter and not the standard one.

The part number is: ACC13

### 6. C) DATA CORRUPTION

In a small number of cases, the wiring inside the wall socket for the Herald PABX can cause interaction between the speech and data lines, causing data corruption. It tends to occur on extensions furthest away from the PABX. If it occurs, the wall socket must be re-wired.

### 6. D) NO DIAL TONE, AND UNSUCCESSFUL MANUAL DIAL TO KNOWN OPERATING HOST COMPUTER

This occurs with PABX's or key systems such as the Ambassador, Earl, Senator, and Merlin equivalents (S2616, S6022, S4022).

It can be caused by the fact that the special handset within these units has to be "off the hook" in order to provide a line. This prevents autodialling by any device such as an autodial modem.

You should arrange for British Telecom to install the correct socket.

In the meantime, you may manually dial the telephone number using the phone handset, and without replacing the handset, seize line on the modem by keying (hash). As the handset is off the hook, data corruption may occur in noisy environments.

### 6. E) LINE LOST WHEN HOST ANSWERS

This can occur with Kingsman and Viceroy key systems when used with tonedial.

The problem is occasional line-loss when the host modem answers.
It arises from the fact that the PABX misinterprets the host modem carrier signal.

Tone dialling : p16, p14

**APPENDIX 4**

## IMPORTANT NOTES ABOUT CONDITIONS OF USE

1. These modems are supplied for use with exclusive lines of British Telecom's Public Switched Telephone Network.

2. These modems are not suitable for use as an extension on a Payphone line.

3. All modems in this series are suitable for use with BT lines having loop disconnect dialling. Modems having '2' as the last digit in model number may also be used with lines having MF dialling. Does it auto select tone/pulse?

4. The REN value of these modems is 3

   REN (Ringer Equivalence Number) is an indication of the number of items of apparatus which may be concurrently connected on a line without causing the bell on a standard BT phone to cease to function.

   REN is derived from the expression REN = 3/N

   where N is number of concurrent devices.

   A standard BT phone is assumed to have a REN = 1

5. The approval of this terminal for connection to the British Telecom public switched telephone network is invalidated if the apparatus is subject to any modification in any material way not authorised by the SSI it is used with, or connected to:
   a) internal software that has not been formally accepted by SSI
   b) external control software or apparatus which causes the operation of the modem's or associated call set-up equipment to contravene the requirements of the standards set out in BABT/SITS/82/005/D

All apparatus connected to this terminal and thereby connected directly or indirectly to the British Telecom public switched telephone network must be approved apparatus as defined in Section 22 of the British Telecommunications Act 1984.

6. The interconnection of the telephone outlet socket with any other port or connection on these modems, whether directly or by way of other apparatus, may cause hazardous conditions to appear on the BT line. You are advised to seek the advice of a competent engineer before attempting such interconnecton.